# Exploring International Economic Integration through *Sukuk* Market Connectivity: A Network Perspective

**Mehmet Asutay**
Professor of Middle Eastern and Islamic Political Economy & Finance
Durham University Business School, Durham Centre for Islamic Economics and Finance, Durham University, UK

**Amira Hakim**
Researcher, University of Sfax, Tunisa
Visiting Research Fellow, Durham Centre for Islamic Economics and Finance, Durham University Business School, Durham University, UK

## Abstract

This paper aims to measure the degree of international financial and economic integration through *sukuk* markets among the eight *sukuk* issuing countries for the period of 2004–2014. In empirically modelling the study, the 'standard perfect financial integration indicators' (SPFII) developed by Arribas *et al.* (2011) are utilised. In doing so, the degree of financial openness of the sampled countries and the degree of the regularity of the financial connections between the sampled countries are measured. The results show that countries such as the UK, Saudi Arabia, Qatar, Bahrain, and the UAE seem to be more integrated in their individual measures, which were found to be more integrated in comparison to the other countries in the sample. However, the global indicators suggest that the entire economy of the sample is not in a state of stable integration, unlike as is suggested by the *sukuk* relationship.

*Keyword*: sukuk, Islamic financial sector, financial integration, openness, connectivity

## 1. Introduction

In the context of financial globalisation, Islamic finance seems to be a strategic option to guard against economic crises as well as furthering the practice of using ethical values in everyday transactions, both economic and financial. Through financial innovations, such as by adapting to both economic and non-economic changes in the

environment and adapting the principles of Islamic economics to suit modern times, Islamic finance has emerged since the 1970s as a viable, resilient, and successful industry. Its expansion, based on the asset base of the Gulf countries due to increased petroleum revenues, motivated the emergence of Islamic financial institutions in the 1970s. Along with an increase in 'petrodollars', the search for an authentic Islamic identity as well as reform has further played an important role in the emergence of Islamic economics, including the foundation of Islamic finance in the post-1960 period (Asutay, 2012).

The operation of Islamic finance is based on the fundamental principles derived from Islamic ontology to ensure *Shari'ah* compliancy, which are the prohibitions of *riba* (interest), *gharar* (uncertainty), and *maysir* (gambling) as well as the limiting of speculation help to ensure *Shari'ah* compliancy, and defining *halal* or lawful business and investment areas (Ayub, 2007; Asutay, 2015). Such normative principles helped to develop an industry that is both resilient and robust. In addition, Islamic ethical norms provide the necessary substance required for such resilience and robustness, which is aimed at an ensured form based on an understanding of *Shari'ah* compliancy.

Islamic economics provides a multi-dimensional and multi-disciplinary framework to develop theoretical paradigm in addition to practices such as Islamic banking, Islamic accounting, Islamic finance, and Islamic trade. The field of Islamic finance practice has witnessed important developments in the form of product innovation and institutional developments. Consequently, from a banking-based perspective, we are now in the process of moving towards financial paradigms within which Islamic markets, both financial and capital, will play an even greater role in the 'Islamising of business'. An important aspect of the developments within the creation and sustenance of Islamic capital markets has been represented by the *sukuk*, or Islamic bonds, markets which have become essential Islamic financing instruments, in particular for project financing. The emergence of *sukuk* markets has enhanced diversity in the nature of Islamic finance by shifting away the financial activity from bank-based Islamic finance.

In view of the development trajectory of the Islamic finance sector, in conjunction with its *Shari'ah* and moral underpinnings, this paper therefore aims to investigate its degree of integration as well as the connectivity between the *sukuk*-issuing countries sampled

in this study. In short, this paper aims to measure and explore the integration and connectivity of the eight sampled countries through their *sukuk* activities.

In doing so, this paper applies a particular model, put forward by Arribas *et al.* (2011), who developed a number of indicators called 'standard perfect financial integration indicators' (SPFII). By applying these indicators, this paper aims to measure the degree of financial openness as well as the degree of regularity of economic and financial connectedness between the sampled countries. In doing so, this paper aims at determining the degree of financial integration for each of the sampled countries as well as for the economies of the entire sampled countries.

This study should be considered novel in its methodology and approach in relation to Islamic capital markets or the *sukuk*-related literature, as it is the first to examine financial and economic connectedness between the *sukuk* issuing countries. Consequently, it is first paper applies the methodology developed by Arribas *et al.* (2011) to *sukuk* related studies. These two establishes the contribution and distinctiveness of this study; as the majority of the *sukuk*-related existing studies relate to distinctiveness of *sukuk* compared to bonds, their comparative return, and risk-related issues. For example, Said and Grassa (2013) examine the impact of the macroeconomic factors on the use of certain *sukuk* structures, while Godlewski *et al.* (2016) investigate the impact of stock market reactions on the choice of *sukuk* structure and also on the reputation of *Shari'ah* scholars involved in issuing the *sukuk*. In another study, Klein and Weill (2016) comparatively examine the factors leading the corporates issue *sukuk* or bond. In a similar study, Mohamed *et al.* (2015) explores the reasons as to why corporations issue *sukuk* or conventional bonds among the Malaysian listed firms. In examining the impact of macroeconomic environment, Naifar and Hammoudeh (2016) investigates the influence of global financial uncertainties on *sukuk* return. In another comparative study, Maghyereha and Awartanib (2016) by employing dynamic spillover index methodology, explores returns and volatility spillovers by comparing *sukuk* and bonds. Arundina *et al.* (2015) develops an empirical model to examine predictive accuracy of two models for the investors in estimating the ratings assigned for *sukuk* issuances by various rating agencies. Among others, as these studies demonstrate while there has been increasing academic interest in *sukuk* related empirical work, the existing studies have not investigated financial and economic linkage between *sukuk* issuing

countries. Therefore, this study fills the observed gap, which should be considered a novel empirical attempt in *sukuk* literature by using a particular methodology.

The methodology used in this research is mostly used in banking and in the bonds markets; however, this paper is the first in applying to the *sukuk* market. The rationale of using such a methodology and approach, as compared to the prevailing ones in *sukuk* market-related studies, stems from the following reasoning. Firstly, this approach helps to locate the economic consecutiveness beyond treating the *sukuk* issuance as a financial matter. Secondly, this approach not only focuses on the degree of openness but also on describing the direction and intensity of *sukuk* connections. Thirdly, the indicators also take into account the regularity of the network of bilateral cross-border flows, as the cross-border flows of *sukuk* should not show geographical and home bias and are not influenced by distance or barriers between countries but rather the size of the *sukuk* market. This methodology requires specific data, such as the fly-in and fly-out of *sukuk* for each country of the sample. Furthermore, the measurement of financial integration considers only how the bonds market is open, while they completely disregard the bonds market connections that each country has with the rest of the world. Overall, this paper should be considered a significant contribution to the literature by extending *sukuk*-related studies beyond the existing and often repeated models and approaches.

As for the organisation of this paper, the next section presents a background section on the trajectories of Islamic finance, followed by Section 3, which focuses on the development of the indicators. Section 4 presents the data and details the findings, while Section 5 concludes the paper.

## 2. Trajectories of Islamic Financial Development and *Sukuk* Issuance

In the post-financial crisis period, the development of Islamic finance has demonstrated unprecedented successes by diffusing into the financial system of many countries in the world, regardless of their religious denominations. More than 500 financial institutions are operating in this sector throughout the world (The Banker, 2015), and they are mainly concentrated in the GCC, South East Asia, and the Middle East. The main tipping point of the industry is Malaysia and the GCC countries, with Indonesia and Turkey having a high growth potential. The Banker (2015) estimates the overall value of the industry to be at about USD2 trillion. Today, Islamic finance is expanding

rapidly. Notably, political will has been an important motivator for the expansion of the sector in countries where high growth rates have been witnessed in Islamic finance.

Thus, the emergence and penetration of Islamic financial institutions have changed the financial environment in the countries wherein they have played an important role in the financial sector. In comparison to the 1980s and 1990s, the industry has matured and competition is shaping the development and innovation of the sector. Hence, the higher the degree of competition, the more efficient the allocation of funds. Furthermore, the functioning of Islamic banks and financial institutions will enable them to be more efficient in acting as intermediaries between depositors and borrowers.

The political implications of the growth of the industry through the enabled competitive conditions is particularly pertinent because policy makers traditionally use market structure as a key variable in targeted policies to develop competition, the promotion of financial liberalisation, and the abolition of barriers to entry.

The development of this sector is not only due to Islamic identity-oriented patronage, which seeks financial products that are *Shari'ah* compliant, but also due to their efficiency, competitiveness, and resilience against financial crises. Several financial analyses reveal that Islamic finance is an ethical alternative that avoids the excesses of speculation whilst reinstating ethical values, including trust, which are no longer located in mainstream conventional finance. Therefore, in order to benefit from this growing ethical proposition, in addition to the opportunity gaps that have been created, conventional banks and financial institutions have entered the industry with Islamic windows by also issuing *sukuk,* or Islamic bonds.

A *sukuk* is an innovative financial instrument that is similar to conventional bonds with respect to cash flow and risk. In addition, it has emerged as an important debt security instrument for the global Islamic financial sector, leading to the creation of the Islamic capital market within the prevailing conventional capital market. This emergence reflects an attempt to create a semi-independent financial sector under the prevailing system.

Regarding its definition, the Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI, 2010) define *sukuk* to be certificates of ownership in a pool of underlying assets in which the certificates are of equal value. *Sukuk* are issued

with the aim of using the mobilised funds to establish a new project, develop an existing project, or finance a business activity *as per* the respective shares.

*Sukuk* structures are constructed within *murabahah, salam, ijara, istisna*, and within partnership forms of *mudarabah and musharakah*. It should be noted that *murabahah*, *salam*, and *istisnaa sukuk* certificates are not readily tradable on the secondary market due to *Shari'ah* restrictions (Al-Amine, 2012).

The survey on *sukuk* issues will show that most offerings to date are *ijara*, or asset-based, with some recent innovations taking place in the structuring and pricing of *musharakah sukuk* structures (Abdel-Khaleq and Richardson, 2007; Wilson, 2008). In a typical *ijarah sukuk* structure, the originator sells real assets to the *sukuk* issuer, and a bankruptcy-remote special purpose vehicle (SPV) is created to act as a trustee for investors acquiring the assets (Iqbal and Mirakhor, 2011). Alternatively, in a *musharakah sukuk* structure, the two parties include an originator providing a pool of assets and an SPV, which raises cash by selling *sukuk* notes to investors (Nathif and Abdulkader, 2004).

As far as the development trajectories and trends of *sukuk* markets are concerned, the worldwide financial industry has gone through a process of integration, reaching its peak with the issuance of *sukuk* in several non-Muslim countries, such as the UK, South Africa, Luxembourg among others. As the expressed political willingness indicates, London is seeking to retain its role in the provision of Islamic financial services, signalling its intention with the UK Finance Bill 2007 (Miller *et al*., 2007), in which legislation was designed to place *sukuk* on a level playing field with conventional securitization formats by providing tax treatments equivalent to similar financial products. In 2009, two issues marked a widening in the recognition and acceptance of *sukuk* outside the Islamic world (Parker, 2010b). The first was the much-oversubscribed, 5-year, AAA-rated USD100 million *sukuk* of the International Finance Corporation (IFC), which was jointly arranged by HSBC, Dubai Islamic Bank, and Kuwait Finance House-Bahrain. The second issue was the US-based, GE Capital's, 5-year, USD500 million *sukuk* to raise money for general corporate and balance sheet purposes. After this date, the *sukuk* market was developed. According to the 2013 Annual Global *Sukuk* Report (Rasameel, 2014), sovereign and quasi-sovereign *sukuk* issuances fared better, with a combined total volume of USD 88.2bn during 2013, 6.9%

lower compared with USD 94.7bn in 2012. After the UK's long-promised issuance of *sukuk* in 2014, several high-profile debut sovereign issuances were expected to take place in many countries, including Ireland, South Africa, Tunisia, Mauritania, Senegal, and Oman, amongst others. As expected, further anticipation of sovereign issuances by the UK is likely to spur many jurisdictions not within the Organisation of the Islamic Cooperation (OIC) to issue sovereign *sukuk*, particularly in the European region. These financial institutions transact across borders. They thus improve their resilience regarding the international financial system by further diversifying their risks.

The capital market is the best example to investigate the degree of growing international interdependency. Cross-border integration can proceed gradually since geographical proximity is still an important determinant in flows of cross-border financial business (Berger *et al.,* 2000; Portes and Rey, 2005; Portes *et al*., 2001). The integration of financial markets has had several advantages, such as price convergence between different geographic markets as well as the increasing cross-border allocation of investment (*see*: Baele *et al*., 2004; European Central Bank, 2007; García-Herrero and Wooldridge, 2007; Rogoff, 2004).

According to the 2013 Annual Global *Sukuk* Report (Rasameel, 2014), conventional and Islamic banks involved in new types of *sukuk*, which will incur additional product development costs, often without the certainty that these costs can be regained. Yet, for those who do launch successful products, the rewards can ultimately be high. Even if other institutions copy the same formula, the recognition that comes from being first in the field can be very helpful for the generation of longer-term business. Thus, such an innovative instrument will encourage the others to adopt.

Regarding the AAOIFI, the current practices of issuing *sukuk* that replicate the structure of conventional bonds in terms of a lack of ownership, the right to a fixed return, and the guarantee of repayment of principal make most *sukuk* un-Islamic. There are, thus, many controversies surrounding the issuance of *sukuk*. For example, Usmani (2007) argues against seeking international bond ratings, since *sukuk* can be rated by recently established regional ratings agencies (such as in Malaysia, where it is called Agency Malaysia), if needed and Islamic banks should stand ready to endorse the acceptability of *sukuk.* Even with this controversy, the emergence of *sukuk* in the capital markets has received a great deal of attention as there is strong evidence that Malaysia, Indonesia,

Pakistan, the GCC countries, the MENA countries and Turkey is expanding their *sukuk* financing base, while Europe, Hong-Kong, Japan, and South Korea developing their financial capacity for *sukuk* issuance.

This paper evaluates the evolutionary trends in the *sukuk* market through financial integration indicators. As has been stated, the previous studies in the literature try to use a common measure, such as descriptive or statistical measures, to evaluate this development; however, our approach is new as it takes into account not just the degree of openness but also the degree of connectivity by measuring the intensity of fly-in and fly-out of cross-border in the international *sukuk* market. Our findings are original for the current literature of studies related to *sukuk* as a topic of financial integration whereby the international interdependency of the *sukuk* market has not yet been discussed.

## 3. Theoretical Framework

As previously mentioned, this study aims to measure the degree of integration of Islamic finance in the world through *sukuk* by the application of international integration indicators on market capital. Thus, Krugman's (1996) theoretical framework on economic geographical neutrality informs the structure of this paper. The geographic distribution of a country's trade is reportedly neutral if the weight of every partner in the country's trade is equal to its weight in the world trade.

In operationalising this theoretical framework, however, the financial integration model and indicators developed by Arribas *et al*. (2011) for capital markets is applied, which build on the studies by Frankel (2000) and Arribas *et al*. (2009; 2010). In their modelling, Arribas *et al*. (2011) define the standard of perfect financial integration (SPFI), which, according to the hypothetical scenario, is achieved when financial cross-border assets and liabilities show no geographical bias and are not influenced by distance or barriers between countries, but merely by the size of the banking systems (Arribas *et al.*, 2011).

Thus, we can define a 'standard perfect *sukuk* integration' that corresponds to the hypothetical scenario achieved when financial cross-border assets and liabilities show no geographical bias and are not influenced by distance or barriers between countries, but only by the size of capital markets. Consequently, this will facilitate the measuring

of the gap between the current level of international *sukuk* integration and the hypothetical scenario of complete *sukuk* globalisation.

With reference to Kali and Reyes' (2007) globalisation perspective, measuring banking integration by considering not only how open the banking system is implies completely disregarding the architecture of banking connections that each country has with the rest of the world. The international integration of the *sukuk* market concerns not only the degree of openness, but further the architecture of *sukuk* connections between markets. In explanation of this, recent literature has examined international financial links using network-based measures of connectedness. For example, Fagiolo *et al*. (2009) and Kali and Reyes (2009) used a network of international trade linkages as the foundation and motivating source for financial flows of various kinds, such as trade credit, bank loans, and speculative finance. These measures of connectedness help explain, for instance, why the Mexican, Asian, and Russian financial crises were highly contagious while crises that originated in Venezuela and Argentina did not have such a virulent effect (Didier *et al*., 2008).

There are other studies which reflect how relevant network approaches are when examining different issues in finance, such as the inter-financial market (*see*: Boss *et al*., 2004; Lelyveld and Liedorp, 2004), the overnight money market (*see*: Iori *et al*., 2008), and the mechanisms through which financial transactions operate (*see*: Inaoka *et al*., 2004). In another study, Fracasso and Schiavo (2009) use a network approach in the context of the international financial crisis to control for the network since it can facilitate the contagion of the crisis. Furthermore, in a recent study, Diebold and Yilmaz (2014) explored several connectedness measures built from pieces of variance decompositions to track the daily time varying connectedness of major US financial institutions' stock return volatility in recent years, with emphasis on the financial crisis of 2007–2008. To analyse the network connections between *sukuk* markets, we consider the literature on geographic bias flows of the banking systems. However, this study does not only focus on the geographical bias, but rather considers the international size of *sukuk* market. Many banking services remain local, probably because of competitive advantages that the superior information of banks regarding local as well as non-financial suppliers and customers represents (*see* also; Berger *et al*., 2000; Berger *et al*., 2003; Berger and Smith, 2003). Moreover, Manna (2004) indicates that geographical

proximity and a common language still provide a rationale for a home bias in banking retail products, whereas the effect is less pronounced in the wholesale segments.

Based on the study by Arribas *et al*. (2011), this study develops indicators of *sukuk* integration which take into account the degree of Islamic capital market openness as well as the regularity of the connections between sampled countries which issue *sukuk*. Thus, the approach used in this study is tightly linked to the indicators of financial integration developed by Arribas *et al*. (2011), which are described in the following sections.

### 3.1 Defining *sukuk* integration indicators

The emergence of *sukuk* in the early 1990s has changed the nature and shape of the Islamic finance industry by resulting in the development of Islamic capital markets, which have transformed the industry from a 'bank-based' sector to a 'financing-based' one. The expansion of *sukuk* markets has facilitated increased cross-border financial flows, motivating better international integration. However, the international integration of *sukuk* depends on the structure of relationships between *sukuk* markets, whereby this structure includes the number of asset trading partners and either the direct or the indirect relationships. The volume of cross-border *sukuk* activity between countries is important, as is the proportionality of this activity to the size of the *sukuk* markets. In this study, geographic neutrality is considered within the conceptual framework by Krugman (1996), which implies that the proportion of home and foreign assets held by domestic investors should be proportional to the relative sizes of each *sukuk* market. Thus, the concept of standard perfect *sukuk* integration is defined as an extension of the concept of geographic neutrality. As discussed previously, the theoretical formulation in this paper draws on Arribas *et al.* (2009, 2009b, 2010, and 2011), which is applied to *sukuk* in the following sections of this paper.

#### 3.1.1 Degree of *sukuk* openness

This section aims to develop a model by taking into account the fact that investors hold a proportion of domestic assets, the volume of which will vary depending on the size of each particular domestic *sukuk* sector.

In modelling, $\hat{X}_i$ is defined as the foreign *sukuk* of the country *i,* considering the domestic *sukuk* market weight of the country in the world *sukuk* market:

$$\hat{X}_i = X_i - a_i X_i$$

where:

$a_i$: Country *i*'s *sukuk* market's relative weight with respect to the world *sukuk* market, which is defined as:

$$a_i = \frac{X_i}{\sum_{j \in N} X_j}$$

where $N = \{1,..., g\}$ is the set of countries, and $g$ is the number of countries in $N$, which is the number of *sukuk* markets in the analysis. We define the degree of *sukuk* openness between countries *i* and *j* as:

$$DSO_{ij} = \frac{X_{ij}}{\hat{X}_i}$$

where:

$X_{ij}$ is the cross-border *sukuk* activity between countries *i* and *j*.

The degree of *sukuk* openness for a country $i \in N$ is as follow:

$$DSO_i = \sum_{j \in N \setminus i} DSO_{ij} = \sum_{j \in N \setminus i} \frac{X_{ij}}{\hat{X}_i}$$

where:

*DSO<1*: indicates that the cross-border *sukuk* flows are lower than the corresponding given country *i*'s share of the world *sukuk* assets;

DSO>1: indicates that country *i*'s cross-border *sukuk* are higher than those corresponding given country *i*'s share of world *sukuk* assets.

Particularly, international integration is not only a question of increasing the openness of countries, but further of developing a 'network' of direct and indirect relationships between *sukuk* markets.

3.1.2 Degree of regularity of direct *sukuk* connections

The 'degree of regularity of direct *sukuk* connections' measures the discrepancy between direct cross-border *sukuk* flows in the real global *sukuk* market and those corresponding to a global *sukuk* sector, where each country balances its relationships with other individual countries in proportion to size of their *sukuk* market.

$$DDSC_i = \frac{\sum_{j \in N} \alpha_{ij} \beta_{ij}}{\sqrt{\sum_{j \in N} (\alpha_{ij})^2} \sqrt{\sum_{j \in N} (\beta_{ij})^2}}$$

where:

$\alpha_{ij} = \frac{X_{ij}}{\sum_{j \in N} X_{ij}}$ is the relative flow from country *i* to country *j* in terms of the total *sukuk* flows of country *i;*

$\beta_{ij} = \frac{X_{ij}}{\sum_{k \in N/i} X_k}$is the relative weight of the country *j* in a world where country *i* is not considered;

where $i \neq j$ and $\alpha_{ij} = 0$ (recall that $X_{ii} \neq j$);

If the world *sukuk* market is 'completely' connected in the sense that the *sukuk* flows between two countries are proportional to the relative size of their *sukuk* systems, then the flow from country *i* to country *j* should be equal to $\beta_{ij} \hat{X}_i$;

$\sum_{j \in N/i} \beta_{ij} = 1$: $\beta_{ij}$ is the degree of *sukuk* market openness between countries *i* and *j* in the perfectly connected world, with $\beta_{ii} = 0$;

*A*=($\alpha_{ij}$) is the square matrix of relative flows (the component *ij* of matrix *A* is $\alpha_{ij}$);

*B*=($\beta_{ij}$) is the square matrix of degree of openness in the perfectly balanced connected world.

Then, this can be defined as 'neutral financial trade'; therefore, it is the financial counterpart of the concept of geographic neutrality. Thus, the *DDSC* is an indicator which measures the distance between the real distribution of *sukuk* flows and which corresponds to a perfectly balanced connected world.

3.1.3 Degree of regularity of total *sukuk* connections

The 'degree of regularity of total *sukuk* connections' is the indicator that considers the indirect relationships between countries vis-à-vis their respective domestic *sukuk* market provided there are no direct connections. Part of the *sukuk* flow from country *i* to country *j* may cross third countries, and those indirect flows must be taken in consideration. For the case of the *sukuk* market, we can take the financial centre of the UK or the financial centre of Bahrain. To control for the indirect relationships between countries, we define $\gamma_i \in (0,1)$ as the proportion of flow that country *i* receives from another country to be invested in the first, which is explained as:

$$\gamma_i = \frac{X_{ii}}{X_i}$$

Thus, in order to estimate the indirect intermediary connection, a matrix needs to be estimated in the following form:

$A^n = A.A \ \ldots\ldots^n \ A$ as the *n*-times product matrix of matrix *A;*

As explained above, $\alpha_{ij}$as the element *ij* of $A^n$, $\alpha_{ij}^n$ is the relative flow that goes from *i* to *j* crossing *n-1* intermediate countries. Therefore:

$$0 \leq \alpha_{ij} \leq 1 \, for \, all \, n \geq 1$$

In the same way as defined above, we define $B^n$ as the matrix which captures the flow of *sukuk* passing through all countries in a perfectly connected world.

$1 - \gamma_i$ is the proportion of received flows of *sukuk* that a country redirects to another country. We assume that this proportion is equal to the proportion of *sukuk* flows of country *i* that remain invested as domestic financial investments. If country *i* fulfils this assumption then:

$$X_i^F = (1 - \gamma_i)L_i^H + (1 - \gamma_i)L_i^F = (1 - \gamma_i)L_i$$

where:

$X_i^F$: the country *i* assets issued from other countries

$L_i^H$: the home liabilities

$\rightarrow L_i = X_i$ , this implies that $1 - \gamma_i = \sum_{j \in N/i} X_{ii}/X_i$ or that $\gamma_i = X_{ii}/X_i$

So $\gamma_i$ is the proportion of *sukuk* flows that are internally invested in country *i*. It should be noted that the procedure to estimate $\gamma_i$ will hinge on the flow being considered either inflow or outflow.

$\Gamma$ is the square diagonal matrix of total flow proportions so that the element *ii* of Γ is $\gamma_i$ and the element *ij* for $i \neq j$ is zero. The matrix of total flows from one country to another is the sum of the direct and indirect flows and can be estimated as $A^{\Gamma} = \sum_{n=1}^{\infty} \Gamma(I - \Gamma)^{n-1} A^n$ and $B^{\Gamma} = \sum_{n=1}^{\infty} \Gamma(I - \Gamma)^{n-1} B^n$ , where *I* is the identity matrix of order *g*.

$A^{\Gamma}$and $B^{\Gamma}$ depend on matrix$\Gamma$, and ${\alpha_{ij}}^{\Gamma}$ is the element *ij* of the matrix $A^{\Gamma}$ while ${\beta_{ij}}^{\Gamma}$ is the element of *ij* of the matrix $B^{\Gamma}$. Each element of these matrices is the weighted sum of direct and indirect flows through any possible number of intermediate economies.

The degree of regularity of total *sukuk* connections measures the distance of the direct and indirect *sukuk* flows of a country from what its *sukuk* flows would be in a connected world financial system with no geographic bias. The value of this indicator ranges in the [0, 1] interval.

Hence, the *DRTSC* of *i* is defined as:

$$DRTSC_i^{\Gamma} = \frac{\sum_{j \in N} {\alpha_{ij}}^{\Gamma} {\beta_{ij}}^{\Gamma}}{\sqrt{\sum_{j \in N} ({\alpha_{ij}}^{\Gamma})^2} \sqrt{\sum_{j \in N} ({\beta_{ij}}^{\Gamma})^2}}$$

In the general case, if there are no indirect flows, $\gamma_i = 1$ for all countries, then $A^{\Gamma} = A$ and $B^{\Gamma} = B$. Thus, the degree of regularity of total connections and regularity of direct connections coincide. Consequently, when $\gamma_i = 0$, namely the proportion of flow a country *j* receives from a country *i* is independent of *i*, all countries send the same proportion of flow to the country *j*.

3.1.4 Degree of *sukuk* integration

The degree of *sukuk* integration combines all indicators mentioned before, such as the degree of *sukuk* openness and the degree of total *sukuk* connections. Therefore, the degree of *sukuk* integration for the country *i* is:

$$DSI_i^{\Gamma} = \sqrt{\min\{1/DSO_i, DSO_i\} DRTSC_i{}^{\Gamma}}$$

It is the geometric average of its deviation from the balanced degree of *sukuk* openness and *sukuk* regularity of total connections. If the *sukuk* system verifies properties referred before, the $DSI_i$ will be equal to 1.

Then,

$$1 = \sqrt{\frac{\min\{1/DSO_i, DSO_i\}}{DSI_i^{\Gamma}}} \sqrt{\frac{DRTSC_i{}^{\Gamma}}{DSI_i^{\Gamma}}}$$

Hence, each of the two factors is the weight of the degree of openness and regularity of total connections over the degree of integration.

3.1.5. Global indicators

In this section, we define several indicators that characterize the degree of *sukuk* integration for the whole economy (all countries).

Degree of global *sukuk* openness:

$$DSO = \sum_{i \in N} a_i DSO_i$$

Degree of regularity of global direct *sukuk* connections:

$$DGDSC = \sum_{i \in N} a_i DDSC_i$$

Degree of regularity of global total financial connections:

$$DRTSC^{\Gamma} = \sum_{i \in N} a_i DRTSC_i{}^{\Gamma}$$

Degree of *sukuk* integration for the whole economy is:

$$DSI^{\Gamma} = \sum_{i \in N} a_i DSI_i^{\Gamma}$$

It takes the value of 1 if the *sukuk* flows of a country are proportional to the size of the recipient countries (indirect international neutrality). It takes a value close to zero if the largest countries do not receive any *sukuk* inflows and the smallest receive all of them.

**4. Data and Data Source**

The dependent variable in this research is the total amount of *sukuk* flows of the country *i*, as this survey is stratified across geography. The target *sukuk* sample in this study includes all types of *sukuk* in eight states which have dominated the *sukuk* market over the period 2004–2014. Therefore, the sampled countries are Bahrain, Indonesia, Malaysia, Qatar, Saudi Arabia, Singapore, the United Kingdom, and the United Arab Emirates.

The reasons for choosing these countries as being the leading *sukuk* issuance countries are twofold. Firstly, they constitute the largest *sukuk* issuers in the world and, secondly, the flows between countries in these sampled states are important in the sense of volume and/or number of issuances.

Indeed, the data in this study are also crucially determined by the available information, as *sukuk* data is generally incomplete in terms of countries and years. The data used in this study are obtained from Bloomberg and IFIS. With reference to the data for Singapore and Indonesia, their financial systems are far less financialised in the issuance of *sukuk* compared to other large countries such as the UK, Saudi Arabia, or Malaysia. However, they are well connected with international markets.

As shown in Table 1, the total *sukuk* issuance as part of GDP has increased sharply over the 2004–2014 period. By October 2014, UK domiciled *sukuk* issuance represented 0.51% of GDP as compared to 0.43% in 2013. This is under the consideration that the majority of the UK's *sukuk* are in the form of foreign flows aimed at encouraging *Shari'ah* compliant investment via *sukuk* between countries. The *sukuk* flows for all the countries involved are reported in the Appendix. It should be noted that, with the

exception of Malaysia, all countries in the sample have witnessed important increases in foreign flows in terms of the market share of foreign *sukuk* in the national market and as a percentage of GDP from 2004 to 2014. It should be noted that the analysis in this study focuses on cross-border *sukuk* inflows and the *sukuk* assets of each country issued by foreign countries.

**Table 1: Total *Sukuk* Issuance as a Ratio of GDP**

| Years | SA | UAE | Bahrain | Malaysia | UK | Qatar | Singapore | Indonesia |
|---|---|---|---|---|---|---|---|---|
| 2004 | 6.73489E-06 | 1.12E-06 | 0.03455 | 0.000898 | 1.13E-05 | 0 | 0 | 0 |
| 2005 | 0 | 5.4E-06 | 0.070186 | 4.29E-05 | 0.000338 | 0 | 0 | 0 |
| 2006 | 5.57177E-06 | 3.16E-05 | 0.048527 | 0.000239 | 0.000766 | 0.007063 | 0 | 0.000549 |
| 2007 | 3.36622E-06 | 1.82E-05 | 0.087403 | 6.32E-05 | 0.002946 | 0 | 0 | 0.000694 |
| 2008 | 4.9396E-06 | 5.49E-06 | 0.027352 | 0.000109 | 0.001483 | 0 | 0 | 0.009505 |
| 2009 | 7.21241E-06 | 2.06E-05 | 0.066259 | 0.000162 | 0.00205 | 0 | 0.001012 | 0.006392 |
| 2010 | 1.73629E-05 | 8.79E-06 | 0.074498 | 0.000153 | 0.001353 | 0.014732 | 0.000506 | 0.011199 |
| 2011 | 1.56815E-05 | 3.01E-05 | 0.102993 | 0.000646 | 0.002335 | 0.060553 | 0.000548 | 0.011481 |
| 2012 | 4.40872E-05 | 2.04E-05 | 0.071438 | 0.000637 | 0.004801 | 0.049751 | 0.010507 | 0.037341 |
| 2013 | 6.74992E-05 | 1.96E-05 | 0.078054 | 0.000293 | 0.004306 | 0.037382 | 0.006274 | 0.382347 |
| 2014 | 4.02397E-05 | 1.32E-05 | 0.006085 | 0.000278 | 0.005186 | 0.074944 | 0.002871 | 0.003378 |

## 5. Empirical Results

Based on the approach and methodology explored and explained above, this section presents the findings of the study as follows;

### 5.1. Degree of *sukuk* openness

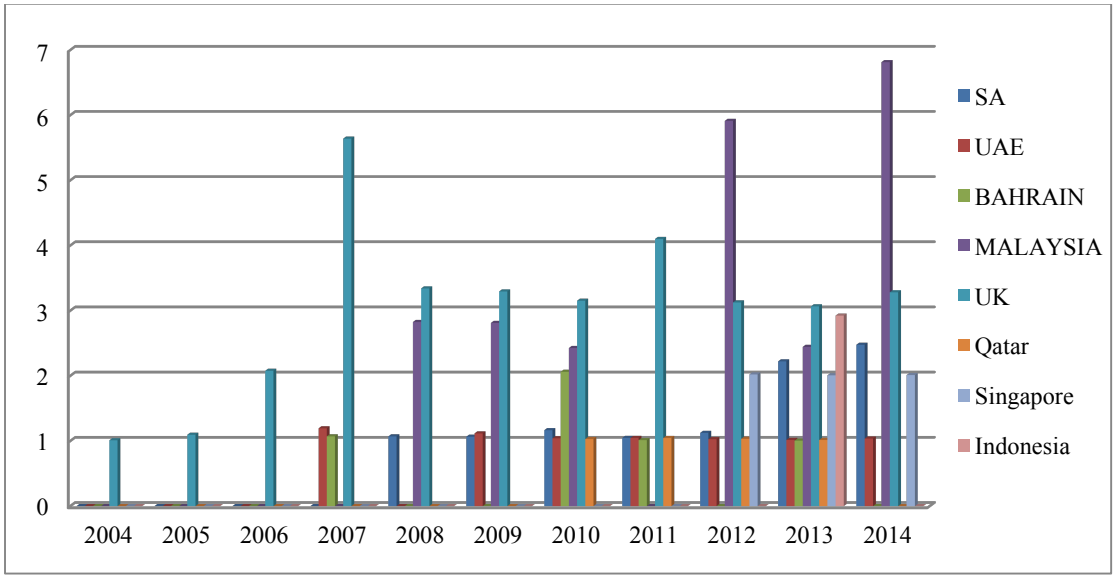
Table 2 depicts the estimated degree of *sukuk* openness, or DSO, in the form of an index for each country in the sample during 2004–2014. As can be seen, the overall results show that the evolution of the openness of a country to the rest of the world, in terms of *sukuk* issuance, is positive in nearly all the periods covered, as all the values of DSO are higher than 1, which indicates that country *i*'s cross-border *sukuk* are higher than a given country *i*'s share of the world *sukuk* assets. The comparison during the period indicates a sharp increase for the degree of openness for Saudi Arabia and Malaysia.

**Table 2: Degree of *Sukuk* Openness (DSO)**

| Years | SA | UAE | Bahrain | Malaysia | UK | Qatar | Singapore | Indonesia |
|---|---|---|---|---|---|---|---|---|
| 2004 | 0 | 0 | 0 | 0 | 1,010154 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 1,094858 | 0 | 0 | 0 |
| 2006 | 0 | 0 | 0 | 0 | 2,076845 | 0 | 0 | 0 |
| 2007 | 0 | 1,19378 | 1,070202 | 0 | 5,639355 | 0 | 0 | 0 |
| 2008 | 1,070282584 | 0 | 0 | 2,82553 | 3,340601 | 0 | 0 | 0 |
| 2009 | 1,065012698 | 1,115516 | 0 | 2,811251 | 3,294043 | 0 | 0 | 0 |
| 2010 | 1,165159008 | 1,04075 | 2,061188 | 2,425959 | 3,151679 | 1,029405 | 0 | 0 |
| 2011 | 1,046420605 | 1,046426 | 1,012801 | 0 | 4,099618 | 1,045419 | 0 | 0 |
| 2012 | 1,123816146 | 1,027325 | 0 | 5,911802 | 3,125789 | 1,033246 | 2,020741 | 0 |
| 2013 | 2,221446894 | 1,015777 | 1,005097 | 2,443731 | 3,065963 | 1,015225 | 2,007436 | 2,923259 |
| 2014 | 2,475801997 | 1,036244 | 0 | 6,813213 | 3,281338 | 0 | 2,0112 | 0 |

Based on Figure 1, Malaysia has the highest degree of openness for 2014 and 2012. However, the UK has become the most open country to the rest of the world in terms of *sukuk* issuance, as the highest value for the UK is 5.6 in 2007. As can be seen, the results vary not only across countries but also over time, and results differ greatly, especially for Malaysia and the UK. As the data in Figure 1 shows, the DSO Index for Bahrain doubled in 2010 compared to 2007, and the same experience was witnessed by Malaysia, as the index for Malaysia nearly doubled in 2012 as compared to 2010. In addition, the DOS Index for the GCC countries such as the UAE and Qatar have increased, indicating gradual openness.

**Figure 1: Degree of *Sukuk* Openness – DSO Index**



Based on the estimations presented in the Appendix, the most important market share for the UK was Saudi Arabia in 2014 and the UAE in 2013. However, in 2004, the UK issued *sukuk* only in Saudi Arabia. In the case of Saudi Arabia, the most important market share was in the UK in 2014 and in 2013.

Overall, regarding the data referred to in this study, we can see that market power has a big influence on the degree of *sukuk* integration as the market power of each country in each foreign market has a big influence on the integration of those countries.

### 5.2. Degree of regularity of *sukuk* connections (DRSC)

The 'degree of regularity of *sukuk* connections' or DRSC, measures the discrepancy between direct cross-border *sukuk* flows in the real global financial system and those corresponding to a global financial system, where each country balances its relationship with other individual countries in proportion to the size of the *sukuk* sector. To be more specific, the DRSC is an indicator that measures the distance between the real distribution of *sukuk* flows and that corresponds to a perfectly balanced connected world.

**Table 3: Degree of Regularity *of Sukuk* Connection (DRSC)**

| Years | SA | UAE | Bahrain | Malaysia | UK | Qatar | Singapore | Indonesia |
|---|---|---|---|---|---|---|---|---|
| 2004 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 2006 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 2007 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| 2008 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 2009 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 |
| 2010 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| 2011 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| 2012 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 |
| 2013 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2014 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 |

Table 3 reports the individual degrees of regularity of *sukuk* connections following the idea of geographic neutrality. All countries that have foreign *sukuk* flows have a DRCS equal to 1%. As mentioned above, if the *sukuk* sector is completely connected, implying that the *sukuk* flows between two countries are proportional to the relative size of their

*sukuk* market, the flows from country *i* to country *j* should be equal to $\beta_{ij}\widehat{X}_{\iota}$. Based on this estimation, as can be seen in Table 3, all countries are not perfectly connected between each other, indicating a decrease in the movement of inflows and outflows between countries. We can explain this by the currency effect and the heterogeneous macro-economic level for each country. This indicator has an important effect for the determination of world *sukuk* integration.

### 5.3. Degree of *sukuk* integration (DSI)

This indicator is the result of a combination between *sukuk* openness and the regularity of *sukuk* connections. Table 4 depicts the estimates of *sukuk* integration in the world financial system.

As can be seen from the estimates in Table 4, for Saudi Arabia, Qatar, the UAE, and Bahrain, the DSI estimates are near to 1, verifying the assumption cited in Section 2. These countries, therefore, are more integrated compared to the other countries in the sample. This can be explained by the concentration of Islamic finance in the GCC countries, as the GCC countries have issued larger number of each year.

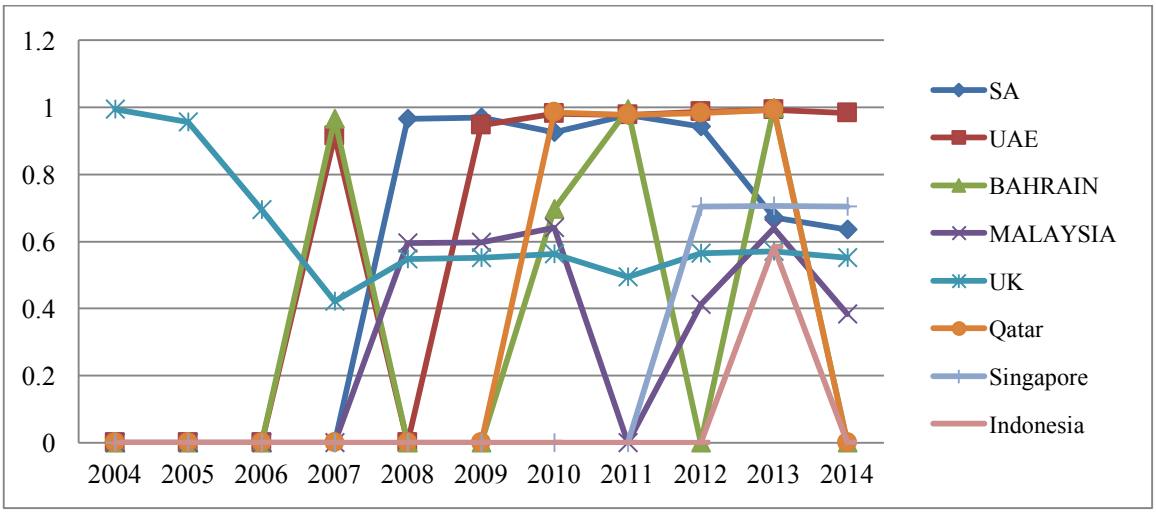
**Table 4: Degree of *Sukuk* Integration (DSI)**

| Years | SA | UAE | Bahrain | Malaysia | UK | Qatar | Singapore | Indonesia |
|---|---|---|---|---|---|---|---|---|
| 2004 | 0 | 0 | 0 | 0 | 0.994961 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 0.955699 | 0 | 0 | 0 |
| 2006 | 0 | 0 | 0 | 0 | 0.693902 | 0 | 0 | 0 |
| 2007 | 0 | 0.915246 | 12.39736 | 0 | 0.4211 | 0 | 0 | 0 |
| 2008 | 0.966608858 | 0 | 0 | 0.594908 | 0.547126 | 0 | 0 | 0 |
| 2009 | 0.96899739 | 0.946808 | 0 | 0.596417 | 0.550979 | 0 | 0 | 0 |
| 2010 | 0.926418889 | 0.980227 | 0.782768 | 0.642034 | 0.563286 | 0.985614 | 0 | 0 |
| 2011 | 0.977567734 | 0.977565 | 21.84696 | 0 | 0.493888 | 0.978036 | 0 | 0 |
| 2012 | 0.943305499 | 0.986611 | 0 | 0.411282 | 0.565614 | 0.98378 | 0.703469 | 0 |
| 2013 | 0.670937448 | 0.992204 | 0.997461 | 0.639696 | 0.571106 | 0.992473 | 0.705796 | 0.584879 |
| 2014 | 0.635538765 | 0.982356 | 0 | 0.38311 | 0.552045 | 0 | 0.705135 | 0 |

Figure 2 provides a descriptive depiction of the DSI measures or index for each country. As can be seen, the UK seems to be the most stable in terms of the DSI index value in comparison to the other countries. However, the results suggest that each country is more integrated today than in the initial years covered by this study, which can be

explained by the financial globalisation of Islamic finance leading to the integration of *sukuk* between countries.

**Figure 2: Degree of *Sukuk* Integration (DSI)**




### 5.4. Global indicators

In this part, we define the global indicator of international *sukuk* integration for the whole economies of the sample countries by taking into account the results of several indicators that are used to define the integration for each country. Table 5 provides global information for the evolution of global *sukuk* openness, GDSC, and GSI, taking into consideration the weight of total *sukuk* in each country.

**Table 5: Global Degree of DSO, DRSC, and DSI**

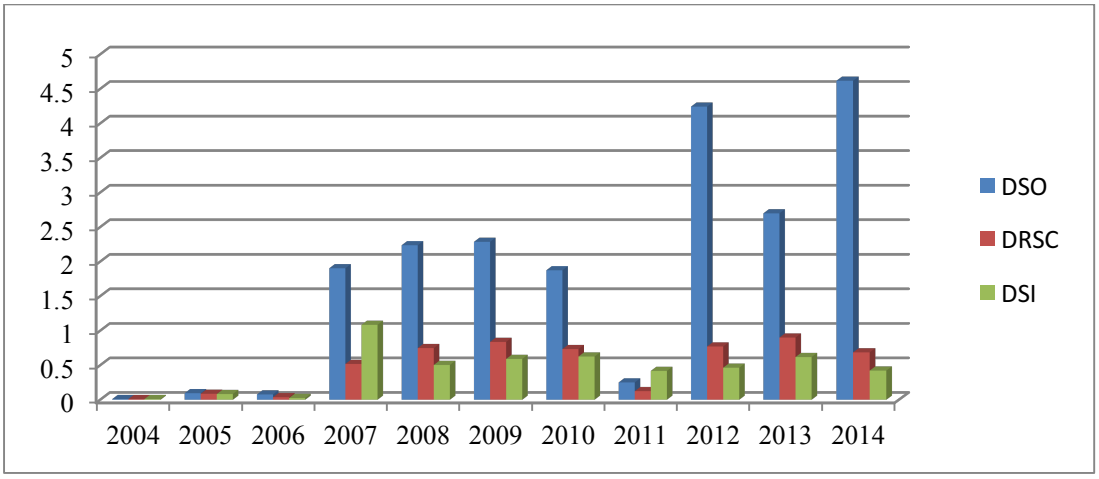
| Years | DSO | DRSC | DSI |
|---|---|---|---|
| 2004 | 0.010153803 | 0.010052 | 0.010001 |
| 2005 | 0.094857526 | 0.086639 | 0.082801 |
| 2006 | 0.076844507 | 0.037001 | 0.025675 |
| 2007 | 1.903336019 | 0.51862 | 1.084206 |
| 2008 | 2.23641351 | 0.748042 | 0.503619 |
| 2009 | 2.285822888 | 0.837105 | 0.590644 |
| 2010 | 1.874139778 | 0.733324 | 0.625581 |
| 2011 | 0.250685524 | 0.124751 | 0.417368 |
| 2012 | 4.2427187 | 0.770974 | 0.46395 |
| 2013 | 2.697934733 | 0.900314 | 0.618095 |
| 2014 | 4.617797033 | 0.685963 | 0.422175 |

The results in Table 5 show that the community of all countries in our sample was totally integrated in 2007, which was the beginning of the subprime crisis. The

resilience of these countries to the subprime crisis can be explained by the complete integration level of countries through Islamic finance. In addition, the results indicate a gap of difference with a theoretical full potential, as mentioned in Section 2, as the trend regarding the degree of integration for the whole economy is not stable, as can be seen in Table 5. This evidences that the Islamic finance sector's development has not yet taken the level of expected globalization in economic integration.

Figure 3 shows all three indices together in a comparative manner as a mean value for the sampled countries. The degree of openness, or DSO, is the most important indicator in comparison to the other indicators, demonstrating that the level and value of DSI is very important. It should be noted that the DDSC has a modest impact on the *sukuk* integration indicator.

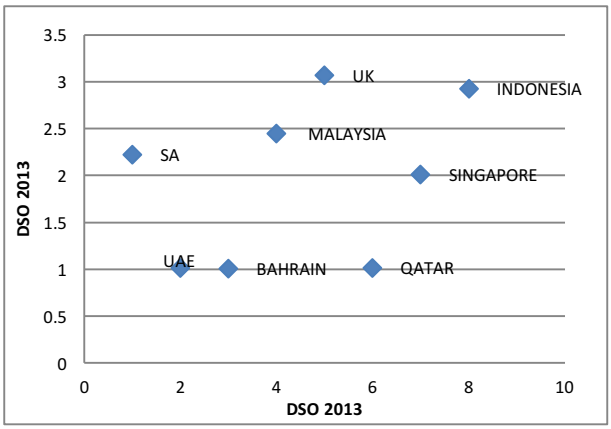
**Figure 3: The Evolution of Global Indicators**

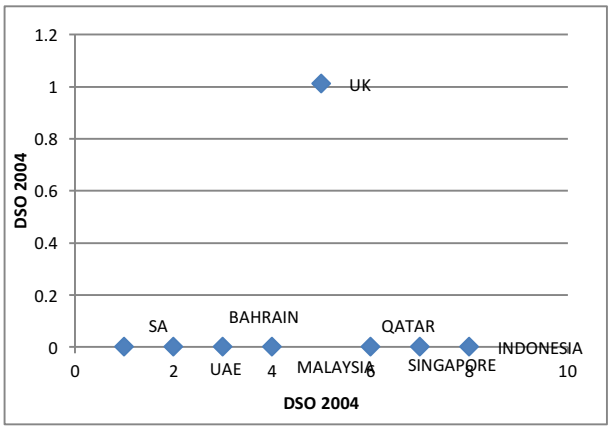


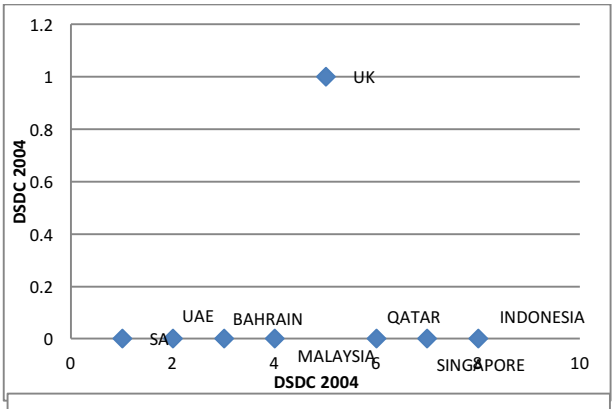

### 5.5. Relative positions between *sukuk* flow directions

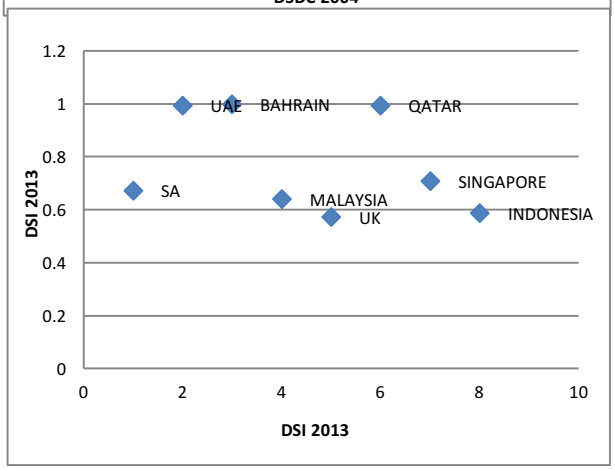
As found above, the UK represents the extreme case in the sampled countries, presenting as it does a stable development of the degree of *sukuk* integration in the examination of the flows of *sukuk*. The aim of this section, henceforth, is to visually display this type of evidence for all countries in the sample. To provide this type of information, Figure 4 depicts in panel form how countries have transited from their positions in 2004 to those in 2013 and 2014.

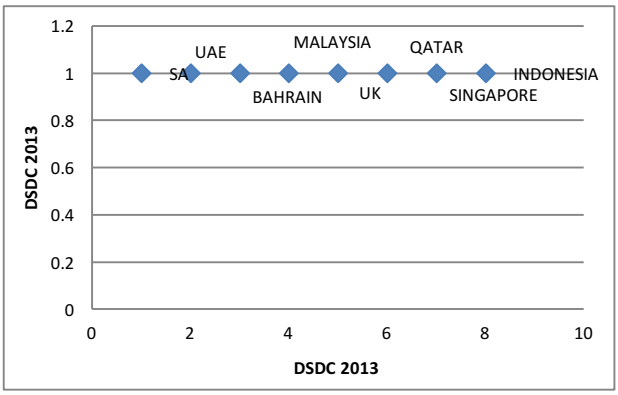
**Figure 4: Positional Transitions for the Sampled Countries**

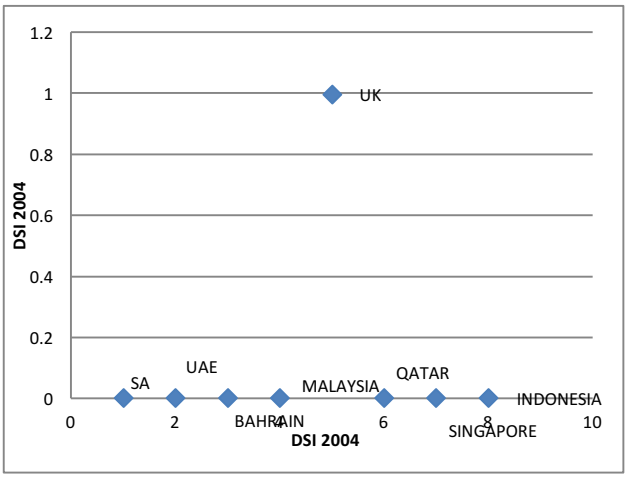



1.2
1
0.8
0.6
0.4
0.2
0
DSDC 2004
UK
UAE
BAHRAIN
QATAR
INDONESIA
SA
MALAYSIA
SINGAPORE
0
2
4
6
8
10
DSDC 2004


1.2
1
0.8
0.6
0.4
0.2
0
DSI 2013
UAE
BAHRAIN
QATAR
SINGAPORE
SA
MALAYSIA
UK
INDONESIA
0
2
4
6
8
10
DSI 2013


1.2
1
0.8
0.6
0.4
0.2
0
DSDC 2013
UAE
MALAYSIA
QATAR
SA
INDONESIA
BAHRAIN
UK
SINGAPORE
0
2
4
6
8
10
DSDC 2013


1.2
1
0.8
0.6
0.4
0.2
0
DSI 2004
UK
SA
UAE
MALAYSIA
QATAR
INDONESIA
BAHRAIN
SINGAPORE
0
2
4
6
8
10
DSI 2004

As can be seen from Figure 4, some countries show opposite behaviours regarding the issuance of *sukuk*, which is becoming extreme over time. The general tendencies for the degree of *sukuk* openness and for the degree of *sukuk* integration are more dynamic than static when comparing the results for the 2004 and 2013 periods. Those countries above the 45-degree diagonal are more open regarding their s*ukuk* issuance. For 2004, the UK is the only country situated above the 45-degree diagonal line. The remaining sampled countries are below the 45-degree diagonal line. For 2013, those countries that are below the 45-degree diagonal tended to shift rightwards.

With reference to the previous studies on financial integration, our finding is similar to that of Christiansen (2014), who found weaker financial integration through the bonds market for the European and non-Europeans countries in their sample.

## 6. Policy Implications and Conclusion

This paper is aimed at assessing the financial integration of the *sukuk* market in those countries in which Islamic finance has significant penetration, whereby eight such countries were selected for the period of 2004–2014. The research is therefore aimed at locating the degree of globalisation of the Islamic finance industry in each of the sampled countries.

The study applied the new indicator of the 'degree of international financial integration developed' by Arribas *et al*. (2011), taking into account the financial openness and the regularity in the network of bilateral cross-border flows to define a standard of perfect financial integration. By using this concept, the empirical evidence produced in this study indicates that the integration of the whole economy in terms of *sukuk* is unstable and tends not to be integrated in the majority of the period of the study. This unstable development can be explained by the low degree of direct connection between economies in terms of *sukuk* issuance. However, the degree of openness is the most important indicator value in the sample as it has an important impact on determining the developmental trends in the degree of *sukuk* integration.

Overall, the results in this study prove that Islamic finance has not yet reached total globalization, as Islamic finance and the economies of the main *sukuk* issuing countries with high Islamic finance penetration have not yet been integrated between themselves

due to the issues of openness and connectivity. This has not helped these countries to enjoy the synergy effect observed of high Islamic finance penetration.

It is important to state that the general economic and financial openness and connectivity of a country determines how various sectors in its economy will be able to connect with the rest of the world within their particular area. Thus, the openness and connectivity of Saudi Arabia, for example, will determine how the Saudi Islamic finance market in general, and the Saudi *sukuk* market in particular, can connect to the rest of the world. While the countries sampled in this study mostly have open economies (as mostly they are members of the WTO), there are still some institutional barriers preventing them from fully integrating with the rest of the world. Thus, the political economy of the sampled countries plays an important role in enhancing openness and connectivity. This is coupled with a conservative regulative environment in some of the sampled countries, thus *sukuk* markets in those countries are unable to achieve their potential in terms of contributing to their local economies as well as global economy.

The model presented and applied to *sukuk* markets in this study produces several implications, as discussed in the section above. The most relevant implication is the unequal distribution of the benefits of financial integration through the *sukuk* market. The welfare gain obtained through the issuance of *sukuk* and the fly-in and fly-out interactions generates a modification in the macroeconomic aggregates, such as investment, consumption, and inflation. Since 'risk sharing' is a major principle of Islamic finance, financial integration through the *sukuk* market can increase the opportunities to diversify risk and thus improve risk sharing, consequently helping the economy become less averse to risk as they are not in situation of excessive risk. Thus, accelerated investment through the facilitation of *sukuk* translates into the promotion of economic welfare.

It should also be noted that financial integration generates a trade-off between economic growth and financial stability, as the *sukuk* issuance will facilitate the expansion of investment and the promotion of economic growth. In terms of monetary policy impact, the issuance of *sukuk* and the fly-in and fly-out influence on monetary policy can help with financial stability through productive channels or the real economy. The targeting of financial stability as part of economic policy may produce less welfare gain than expected, as is found in the case of Saudi Arabia and the UAE, where it can be shown

that the share of *sukuk* in the GDP is less than for the UK. However, the impact of *sukuk* on economic growth is very important for the sampled countries, including the GCC countries.

The introduction of Islamic finance as part of financial development, due to its resilience regarding crises, can evidence that the issuance of *sukuk* in the sampled countries accelerated financial development during the period covered by this study. Financial integration paves the way for financial development, leading to economic growth. However, one implication of financial integration is that there is a trade-off between economic growth and financial stability.

The implications of the financial integration for all the economies of the sample confirm that Islamic finance is an indicator of financial development for the sampled countries. However, for Islamic finance, including *sukuk* markets, to have significant positive impacts, it is essential to develop a regulative system compatible with Islamic finance within the economy that can maintain a good governance of the financial system.

In conclusion, the evidence produced by this study may help policy makers to determine future measures at improving the integration of global financial systems. The integration of Islamic finance through *sukuk* is unavoidable in the efforts to meet the challenges of improving macro-economic aggregates through improving international trade, decreasing inflation, increasing investment, and the appreciation of the exchange rate. As the research findings suggest, the *sukuk* market can reach its full potential through improved integration with other countries that have a sizeable Islamic finance presence.

**References**

Abdel-Khaleq, A. H. and Richardson, C. F. (2007). 'New Horizons for Islamic Securities: Emerging Trends in Sukuk Offerings', *Chicago Journal of International Law*, 409, 415-416.

Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) (2010). *Shari'ah Standards*. Manama: AAOIFI

Al-Amine, M. al-Bashir M. (2012). *Global Sukuk and Islamic Securitisation Market: Financial Engineering and Product Innovation*. Leiden: Brill.

Arribas, I.; Prez, F. and Tortosa-Austina, E. (2009). 'Measuring globalization of international trade: Theory and evidence', *World Development*, 37(1), 127-145.

Arribas, I.; Prez, F. and Tortosa-Austina, E. (2009b). *Openness and geographic neutrality: How do they contribute to international banking Integration?* Working Paper No. 5. Fundacion BBVA, Madrid.

Arribas, I.; Prez, F. and Tortosa-Austina, E. (2010). 'Openness and geographic neutrality: How do they contribute to international banking Integration?', in *Research On Global Financial Stability: The Use Of BIS International Financial Statistics*. CGFS Papers No 40. Proceedings of the second CGFS workshop held at the BIS in December 2008, chaired by Aviram Levy of the Bank of Italy.

Arribas, I.; Prez, F. and Tortosa-Austina, E. (2010).'The determinant of international financial integration revisited: The role of networks and geographic neutrality', *Studies in Nonlinear Dynamics and Econometrics*, https://doi.org/10.2202/1558-3708.1763.

Arribas, I.; Prez, F. and Tortosa-Austina, E. (2011). 'A Network perspective on international banking integration', *Journal of Policy Modeling*, 33, 831-851.

Arundina, A.; Omar, M. A. and Kartiwi, Mira (2015) 'The predictive accuracy of Sukuk ratings: Multinomial Logistic and Neural Network inferences', *Pacific-Basin Finance Journal,* 34, 273–292.

Asutay, Mehmet (2012). 'Conceptualising and Locating the Social Failure of Islamic Finance: Aspirations of Islamic Moral Economy vs the Realities of Islamic Finance', *Asian and African Area Studies,* 11 (2), 93-113.

Asutay, Mehmet (2015) "Islamic Finance: Principles, Institutions and Development", *Trade and Finance*, Winter, 4-26.

Ayub, Muhammad (2007). *Understanding Islamic Finance*. Chichester. West Sussex: John Wiley & Sons Ltd.

Baele, L.; Ferrando, A.; Hordahl, P.; Krylova, E. and Monnet, C. (2004).'Measuring European financial integration', *Oxford Review of Economic Policy*, 20(4), 509–530.

Berger, A. N. and Smith, D. C. (2003). 'Global integration in the banking industry', *Federal Reserve Bulletin*, 89(11), 451–460.

Berger, A. N.; De Young, R.; Genay, H. and Udell, G. F. (2000). *Globalization of Financial Institutions: Evidence from Cross-Border Banking Performance.* Finance and Economics Discussion Series 2000–2004 Board of Governors of the Federal Reserve System.

Berger, A. N.; Ongena, S.; Smith, D. and Dai, Q. (2003). 'To what extent will the banking industry be globalized? A study of bank nationality and reach in 20 European nations', *Journal of Banking & Finance*, 27(3), 383-415.

Boss, M.; Elsinger, H.; Summer, M. and Thurner, S. (2004). 'Network topology of the interbank market', *Quantitative Finance*, 4(6), 677-684.

Christiansen, C. (2014). 'Integration of European bond markets', *Journal of Banking and Finance,* 42, 191-198.

Didier, T.; Mauro, J. and Schmukler, S. L. (2008). 'Vanishing financial contagion?', *Journal of Policy Modeling*, 30, 775-791.

Diebold, F. and Yilmaz, K. (2014). 'On the network topology of variance decompositions: Measuring the connectedness of financial firms', *Journal of Econometrics,* 182(1), 119-134.

European Central Bank. (2007). *Financial Integration in Europe.* Technical Report, ECB, Frankfurt.

Fagiolo, G.; Reyes, J. and Schiavo, S. (2009). 'International trade and financial integration: A weighted network analysis', *Quantitative Finance*, 10(4), 389-399.

Fracasso, A. and Schiavo, S. (2009). 'Global imbalances, exchange rates adjustment and the crisis: Implications from network analysis', *Journal of Policy Modeling*, 31,. 601-619.

Frankel, J. A. (2000). *Globalization of the Economy*. Working Paper No. 7858. NBER, Cambridge, Massachusetts.

García-Herrero, A. and Wooldridge, P. (2007). 'Global and regional financial integration: Progress in emerging markets', *BIS Quarterly Review*, (September), 57-70.

Godlewski, C, J.; Turk-Arris, R. and Well, L. (2016) 'Do the type of sukuk and choice of shari'a scholar matter?', *Journal of Economic Behaviour & Organisation*, http://dx.doi.org/10.1016/j.jebo.2016.04.020.

Inaoka, H.; Ninomiya, T.; Taniguchi, K.; Shimizu, T. and Takayasu, H. (2004). *Fractal Network Derived from Banking Transaction: An Analysis of Network Structures Formed by Financial Institutions*. Working Paper No. 04-E-04. Bank of Japan.

Iori, G.; De Masi, G.; Precup, O.; Gabbi, G. and Caldarelli, G. (2008). 'A network analysis of the Italian overnight money market', *Journal of Economic Dynamics and Control*, 32(1), 259-278.

Iqbal, Z. and Mirakhor, A. (2011). *Introduction to Islamic Finance: Theory and Practice*. New York: John Wiley & Sons (Asia).

Kali, R. and Reyes, J. (2007). 'The architecture of globalization: A network approach to international economic integration', *Journal of International Business Studies*, 38, 595-620.

Kali, R. and Reyes, J. (2009). 'Financial contagion on the international trade network', *Economic Inquiry*, 48(4), 1072-1101.

Klein, P. O. and Weill, L. (2016). 'Why do companies issue sukuk?', *Review of Financial Economics*, http://dx.doi.org/10.1016/j.rfe.2016.05.003.

Krugman, P. R. (1996). 'Regionalism versus multilateralism: Analytical notes', in J. de Melo and A. Panagariya (eds.), *New Dimensions in Regional Integration* (pp. 58-89). Cambridge: CEPR, Cambridge University Press.

Lelyveld, I. and Liedorp, F. (2004). *Interbank Contagion in the Dutch Banking Sector.* Working Paper No. 5, Dutch National Bank, Amsterdam.

Maghyereha, A. I and Awartanib, B. (2016). 'Dynamic transmissions between Sukuk and bond markets', *Research in International Business and Finance*, 38, 246–261.

Manna, M. (2004). *Developing Statistical Indicators of the Integration of the Euro Area Banking System*. Working Paper Series 300. European Central Bank, Frankfurt am Main.

Miller, N. D.; Challoner, J. and Atta, A. (2007). 'UK welcomes the Sukuk'. *International Financial Law Review*, 26, 24-25.

Mohamed, H. H.; Masih, M. and Bacha, O. I. (2015). 'Why do issuers issue Sukuk or conventional bond? Evidence from Malaysian listed firms using partial adjustment models', *Pacific-Basin Finance Journal*, 34, 233–252.

Naifar, N. and Hammoudeh, S. (2016). 'Do global financial distress and uncertainties impact GCC and global sukuk return dynamics?', *Pacific-Basin Finance Journal*, 39, 57–69.

Nathif J. A. and Thomas, Abdulkader (2004). *Islamic Bonds: Your Guide to Issuing, Structuring and Investing in Sukuk*. London: Euromoney Books.

Portes, R. and Rey, H. (2005). 'The determinants of cross-border equity flows', *Journal of International Economics*, 65(2), 269–296.

Portes, R.; Rey, H. and Oh, Y. (2001). 'Information and capital flows: The determinants of transactions in financial assets', *European Economic Review*, 45(4-6), 783-796.

Rasameel (2014, January). *2013 Annual Global Sukuk Report*. Kuwait. Available at: <http://kazansukuk.ru/wp-content/uploads/2015/01/RSFGlobalSukukMarketAnnual2013.pdf>.

Rogoff, K. (2004). 'Extending the limits of global financial integration', *Journal of Policy Modeling*, 26, 519-523.

Said, Ali and Grassa, Rihab (2013). 'The Determinants of Sukuk Market Development: Does Macroeconomic Factors Influence the Construction of Certain Structure of Sukuk?', *Journal of Applied Finance & Banking,* 3 (5), 251-267

The Banker (2016). *Special Issue on Islamic Finance*. London: Financial Times.

Usmani, M.T. (2007). *Sukuk and their Contemporary Applications (translated from the original Arabic by Sheikh Yusuf Talal Delorenzo)*, in AAOIFI Shariah Council Meeting, Saudi Arabia.

Wilson, R. (2008). 'Innovation in structuring Sukuk securities', *Humanomics*, 24, 170-181.

# APPENDIX

## UK

| | Market Share | | | | |
|---|---|---|---|---|---|
| | Saudi Arabia | UAE | Bahrain | Qatar | USA |
| 2014 | 0.519203 | 0.326356 | 0 | 0 | 0.037085908 |
| 2013 | 0.3792 | 0.501977 | 0 | 0.115132 | 0 |
| 2012 | 0.393956 | 0.481002 | 0 | 0.122683 | 0 |
| 2011 | 0.193081 | 0.623295 | 0.052166 | 0.130415 | 0 |
| 2010 | 0.526662 | 0.241499 | 0 | 0.06923 | 0 |
| 2009 | 0.218895 | 0.735924 | 0 | 0 | 0.022096566 |
| 2008 | 0 | 0.876861 | 0.04766 | 0.075479 | 0 |
| 2007 | 0.011881 | 0.915647 | 0.03683 | 0.035642 | 0 |
| 2006 | 0 | 0.911876 | 0 | 0 | 0.088123532 |
| 2005 | 0.671261 | 0 | 0 | 0 | 0 |
| 2004 | 1 | 0 | 0 | 0 | 0 |

| | Total Consolidate Foreign Claims as % of GDP | | | | |
|---|---|---|---|---|---|
| | Saudi Arabia | UAE | Bahrain | Qatar | USA |
| 2014 | 0.00269278 | 0.001692605 | 0 | 0 | 0.000192341 |
| 2013 | 0.001632835 | 0.002161514 | 0 | 0.00049576 | 0 |
| 2012 | 0.001891401 | 0.002309316 | 0.002214 | 0.000589008 | 0 |
| 2011 | 0.000450919 | 0.001455636 | 0.002309 | 0.00030457 | 0 |
| 2010 | 0.000712517 | 0.000326723 | 0.001562 | 9.36606E-05 | 0 |
| 2009 | 0.000448654 | 0.001508373 | 0.00034 | 0 | 1.00075E-08 |
| 2008 | 0 | 0.001300564 | 0.001239 | 0.00011195 | 0 |
| 2007 | 3.50007E-05 | 0.002697507 | 0.001224 | 0.000105002 | 0 |
| 2006 | 0 | 0.000698749 | 0.003104 | 0 | 3.54906E-08 |
| 2005 | 0.000226592 | 0 | 0.000747 | 0 | 0 |
| 2004 | 1.13111E-05 | 0 | 0 | 0 | 0 |

## Saudi Arabia

| | Market Share | | | | |
|---|---|---|---|---|---|
| | UK | Malaysia | UAE | Bahrain | Qatar |
| 2014 | 0,42687 | 0,003971 | 0 | 0 | 0 |
| 2013 | 0,208725 | 0,023485 | 0 | 0 | 0 |
| 2012 | 0,238745 | 0 | 0 | 0 | 0 |
| 2011 | 0,071436 | 0 | 0 | 0 | 0 |
| 2010 | 0,153056 | 0 | 0 | 0 | 0 |
| 2009 | 0 | 0,029039 | 0 | 0 | 0 |
| 2008 | 0 | 0,010605 | 0 | 0 | 0 |
| 2007 | 0 | 0 | 0 | 0 | 0 |
| 2006 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 0 |
| 2004 | 0 | 0 | 0 | 0 | 0 |

| | Total Consolidate Foreign Claims as % of GDP | | | | |
|---|---|---|---|---|---|
| | UK | Malaysia | UAE | Bahrain | Qatar |
| 2014 | 1,71771E-05 | 1,59787E-07 | 0 | 0 | 0 |
| 2013 | 1,40888E-05 | 1,58519E-06 | 0 | 0 | 0 |
| 2012 | 1,05256E-05 | 0 | 0 | 0 | 0 |
| 2011 | 1,12023E-06 | 0 | 0 | 0 | 0 |
| 2010 | 2,6575E-06 | 0 | 0 | 0 | 0 |
| 2009 | 0 | 2,09439E-07 | 0 | 0 | 0 |
| 2008 | 0 | 5,23859E-08 | 0 | 0 | 0 |
| 2007 | 0 | 0 | 0 | 0 | 0 |
| 2006 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 0 |
| 2004 | 0 | 0 | 0 | 0 | 0 |

## Bahrain

| | Market Share | | | | |
|---|---|---|---|---|---|
| | Saudi Arabia | UAE | Bahrain | Singapore | UK |
| 2014 | 0 | 0 | 0 | 0 | 0 |
| 2013 | 0,078149 | 0 | 0 | 0 | 0 |
| 2012 | 0 | 0 | 0 | 0 | 0 |
| 2011 | 0 | 0 | 0 | 0 | 0,100288161 |
| 2010 | 0,052202 | 0 | 0 | 0 | 0,040268947 |
| 2009 | 0 | 0 | 0 | 0 | 0 |
| 2008 | 0 | 0 | 0 | 0 | 0 |
| 2007 | 0 | 0 | 0 | 0 | 0,060548304 |
| 2006 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 0 |
| 2004 | 0 | 0 | 0 | 0 | 0 |

| | Total Consolidate Foreign Claims as % of GDP | | | | |
|---|---|---|---|---|---|
| | Saudi Arabia | UAE | Bahrain | Singapore | UK |
| 2014 | 0 | 0 | 0 | 0 | 0 |
| 2013 | 0,006099771 | 0 | 0 | 0 | 0 |
| 2012 | 0 | 0 | 0 | 0 | 0 |
| 2011 | 0 | 0 | 0 | 0 | 0,010329021 |
| 2010 | 0,003889 | 0 | 0 | 0 | 0,002999975 |
| 2009 | 0 | 0 | 0 | 0 | 0 |
| 2008 | 0 | 0 | 0 | 0 | 0 |
| 2007 | 0 | 0 | 0 | 0 | 0,005292079 |
| 2006 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 0 |
| 2004 | 0 | 0 | 0 | 0 | 0 |

## Malaysia

| | Market Share | | | | |
|---|---|---|---|---|---|
| | SA | UAE | Bahrain | Singapore | UK |
| 2014 | 0 | 0,012158 | 0 | 0,001797 | 0,003857595 |
| 2013 | 0,003237 | 0 | 0,000539 | 0 | 0 |
| 2012 | 0 | 0,000702 | 0,006132 | 0 | 0 |
| 2011 | 0 | 0 | 0 | 0 | 0 |
| 2010 | 0 | 0,047883 | 0 | 0 | 0 |
| 2009 | 0,000834 | 0 | 0 | 0 | 0 |
| 2008 | 0,003558 | 0 | 0 | 0 | 0 |
| 2007 | 0 | 0 | 0 | 0 | 0 |
| 2006 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 0 |
| 2004 | 0 | 0 | 0 | 0 | 0 |

| | Total Consolidate Foreign Claims as % of GDP | | | | |
|---|---|---|---|---|---|
| | SA | UAE | BAHRAIN | Singapore | UK |
| 2014 | 0 | 3,37539E-06 | 0 | 4,98833E-07 | 1,07098E-06 |
| 2013 | 9,49412E-07 | 0 | 1,73E-12 | 0 | 0 |
| 2012 | 0 | 4,47001E-07 | 2,01E-11 | 0 | 0 |
| 2011 | 0 | 0 | 0 | 0 | 0 |
| 2010 | 0 | 7,33719E-06 | 0 | 0 | 0 |
| 2009 | 1,34634E-07 | 0 | 0 | 0 | 0 |
| 2008 | 3,89068E-07 | 0 | 0 | 0 | 0 |
| 2007 | 0 | 0 | 0 | 0 | 0 |
| 2006 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 0 |
| 2004 | 0 | 0 | 0 | 0 | 0 |

## UAE

| | Market Share | | | | |
|---|---|---|---|---|---|
| | Saudi Arabia | Qatar | Bahrain | Singapore | UK |
| 2014 | 0 | 0 | 0 | 0 | 0,909090909 |
| 2013 | 0 | 0 | 0 | 0 | 0,936208216 |
| 2012 | 0 | 0 | 0 | 0 | 0,569643019 |
| 2011 | 0 | 0 | 0 | 0 | 0,147619048 |
| 2010 | 0 | 0 | 0 | 0 | 0,158311638 |
| 2009 | 0 | 0 | 0 | 0 | 0,904761905 |
| 2008 | 0 | 0 | 0 | 0 | 0 |
| 2007 | 0 | 0 | 0 | 0 | 0,638297872 |
| 2006 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 0 |
| 2004 | 0 | 0 | 0 | 0 | 0 |

| | Total Consolidate Foreign Claims as % of GDP | | | | |
|---|---|---|---|---|---|
| | SA | Qatar | Bahrain | Singapore | UK |
| 2014 | 0 | 0 | 0 | 0 | 2,17657E-09 |
| 2013 | 0 | 0 | 0 | 0 | 2,3455E-09 |
| 2012 | 0 | 0 | 0 | 0 | 1,48422E-09 |
| 2011 | 0 | 0 | 0 | 0 | 4,23469E-10 |
| 2010 | 0 | 0 | 0 | 0 | 5,50799E-10 |
| 2009 | 0 | 0 | 0 | 0 | 3,55082E-09 |
| 2008 | 0 | 0 | 0 | 0 | 0 |
| 2007 | 0 | 0 | 0 | 0 | 2,47483E-09 |
| 2006 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 0 |
| 2004 | 0 | 0 | 0 | 0 | 0 |

**Qatar**

| | Market Share | | | | |
|---|---|---|---|---|---|
| | Saudi Arabia | UAE | Bahrain | Singapore | UK |
| 2014 | 0 | 0 | 0 | 0 | 0 |
| 2013 | 0 | 0 | 0 | 0 | 0,165169133 |
| 2012 | 0 | 0 | 0 | 0 | 0,153439153 |
| 2011 | 0 | 0 | 0 | 0 | 0,020909963 |
| 2010 | 0 | 0 | 0 | 0 | 0,406881174 |
| 2009 | 0 | 0 | 0 | 0 | 0 |
| 2008 | 0 | 0 | 0 | 0 | 0 |
| 2007 | 0 | 0 | 0 | 0 | 0 |
| 2006 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 0 |
| 2004 | 0 | 0 | 0 | 0 | 0 |

| | Total Consolidate Foreign Claims as % of GDP | | | | |
|---|---|---|---|---|---|
| | SA | UAE | BAHRAIN | Singapore | UK |
| 2014 | 0 | 0 | 0 | 0 | 0 |
| 2013 | 0 | 0 | 0 | 0 | 0,006174364 |
| 2012 | 0 | 0 | 0 | 0 | 0,007633804 |
| 2011 | 0 | 0 | 0 | 0 | 0,00126616 |
| 2010 | 0 | 0 | 0 | 0 | 0,005994135 |
| 2009 | 0 | 0 | 0 | 0 | 0 |
| 2008 | 0 | 0 | 0 | 0 | 0 |
| 2007 | 0 | 0 | 0 | 0 | 0 |
| 2006 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 0 |
| 2004 | 0 | 0 | 0 | 0 | 0 |

## Indonesia

| | Market Share | | | | |
|---|---|---|---|---|---|
| | Saudi Arabia | UAE | Bahrain | Singapore | UK |
| 2014 | 0 | 0 | 0 | 0 | 0 |
| 2013 | 0 | 0 | 0 | 0,942744 | 0 |
| 2012 | 0 | 0 | 0 | 0 | 0 |
| 2011 | 0 | 0 | 0 | 0 | 0 |
| 2010 | 0 | 0 | 0 | 0 | 0 |
| 2009 | 0 | 0 | 0 | 0 | 0 |
| 2008 | 0 | 0 | 0 | 0 | 0 |
| 2007 | 0 | 0 | 0 | 0 | 0 |
| 2006 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 0 |
| 2004 | 0 | 0 | 0 | 0 | 0 |

| | Total Consolidate Foreign Claims as % of GDP | | | | |
|---|---|---|---|---|---|
| | Saudi Arabia | UAE | Bahrain | Singapore | UK |
| 2014 | 0 | 0 | 0 | 0 | 0 |
| 2013 | 0 | 0 | 0 | 0,360455542 | 0 |
| 2012 | 0 | 0 | 0 | 0 | 0 |
| 2011 | 0 | 0 | 0 | 0 | 0 |
| 2010 | 0 | 0 | 0 | 0 | 0 |
| 2009 | 0 | 0 | 0 | 0 | 0 |
| 2008 | 0 | 0 | 0 | 0 | 0 |
| 2007 | 0 | 0 | 0 | 0 | 0 |
| 2006 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 0 |
| 2004 | 0 | 0 | 0 | 0 | 0 |

## Singapore

| | Market Share | | | | |
|---|---|---|---|---|---|
| | Saudi Arabia | UAE | Bahrain | Malaysia | UK |
| 2014 | 0 | 0 | 0 | 0,354809 | 0,428223955 |
| 2013 | 0 | 0 | 0 | 0,103914 | 0,401232587 |
| 2012 | 0 | 0 | 0 | 0,105889 | 0,497596608 |
| 2011 | 0 | 0 | 0 | 0 | 0 |
| 2010 | 0 | 0 | 0 | 0 | 0 |
| 2009 | 0 | 0 | 0 | 0 | 0 |
| 2008 | 0 | 0 | 0 | 0 | 0 |
| 2007 | 0 | 0 | 0 | 0 | 0 |
| 2006 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 0 |
| 2004 | 0 | 0 | 0 | 0 | 0 |

| | Total Consolidate Foreign Claims as % of GDP | | | | |
|---|---|---|---|---|---|
| | SA | UAE | BAHRAIN | MALAYSIA | UK |
| 2014 | 0 | 0 | 0 | 0,001018721 | 0,001229508 |
| 2013 | 0 | 0 | 0 | 0,000651941 | 0,002517275 |
| 2012 | 0 | 0 | 0 | 0,00111255 | 0,005228149 |
| 2011 | 0 | 0 | 0 | 0 | 0 |
| 2010 | 0 | 0 | 0 | 0 | 0 |
| 2009 | 0 | 0 | 0 | 0 | 0 |
| 2008 | 0 | 0 | 0 | 0 | 0 |
| 2007 | 0 | 0 | 0 | 0 | 0 |
| 2006 | 0 | 0 | 0 | 0 | 0 |
| 2005 | 0 | 0 | 0 | 0 | 0 |
| 2004 | 0 | 0 | 0 | 0 | 0 |